Technology: Optoelectronics

JDS Uniphase has acquired US-based Advanced Digital Optics (ADO) for $12m. ADO makes HDTV light equipment.

Japan's Nichia is to collaborate with Opto Tech of Taiwan to produce InGaN for LEDs.

Vishay Intertechnology Inc's two new infrared emitters are optimised with an 850nm wavelength to improve the optical efficiency of CMOS camera illumination systems compared with industry-standard 870nm emitters. The power devices each have a 20ns rise time and 1.8V maximum forward voltage.

An infra-red quantum dot device using self-assembled quantum dots, each dot with an InAs core surrounded by GaAs and an InGaAs alloy has been developed by Anupam Madhukar, University Southern California, working with Joe Campbell, University Texas, Austin. The 3D confinement of electrons in these structures creates unique, characteristic behaviour. Unlike alternatives, QD IR detectors strongly absorb radiation shining perpendicular to the plane of an array of QDs. By contrast, the alternate QW detectors do not pick up radiation that shines straight down on them increasing the cost of these. Benchmarked, new device detectivity was nearly 100 times higher than the peak for QD systems. The new range is competitive with the values for the well-established QW IR photo detectors.

Applied Optoelectronics has acquired US patent number 6,263,002 from Micron Optics on external-cavity diode laser technology. AOI has granted Micron access to some of its VCSEL patents as part of the deal.

Thailand makes for Sweden

Fabrinet has signed a three-year volume supply agreement with Northlight Optronics of Jarfalla, Sweden.

It is to provide module packaging and manufacture of optical subassemblies for Northlight's longwave optical transmitters/receivers.

Thailand based Fabrinet is to begin shipping 3Q, 2004.

"The demand for active components is picking up and we are getting very encouraging feedback from our customers regarding our new TOSA/ROSA platform," said Dr Dirk Sinerius, COO at Northlight Optronics.

"To comply with requirements for quick turnaround and price competitive products, while still maintaining superior quality and reliability, we decided to partner with Fabrinet."

In July Fabrinet signed a US volume supply agreement with Opnext Inc of NJ to handle the manufacturing of Opnext's 2.5Gb/s and 10Gb/s optical transceivers for ultra long-haul SONET/SDH and WDM use.

"Fabrinet's skilled engineers, low cost labour force, and broad base of optical manufacturing technologies, combined with the stability of the Thai government, are attractive to companies seeking an outsourced manufacturing partner," said CFO Mark Schwartz.

"Since formally opening our European office last year, we have seen a substantial growth in our European business," Fabrinet's manufacture is in Thailand, sales offices in the US and Europe.

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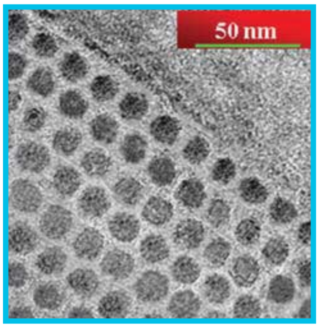
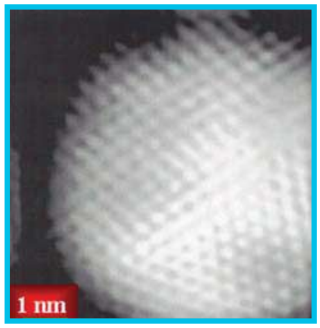
Pulsed laser self-assembly



(a)



(b)

***(a)** TEM image of nickel nanodots embedded in an aluminium oxide matrix and **(b)** STEM showing a single nickel nanocrystal, a nanodot. Each 'bump' is an individual nickel atom. Credit: Jagdish Narayan and Ashutosh Tiwari, North Carolina State University/NSF Center for Advanced Materials and Smart Structures.*

Using pulsed lasers, researchers have coaxed nickel to self-assemble into arrays of nanodots, a tenth the diameter of existing nanodots. Because the method works with a variety of materials, it may drastically reduce imperfections and bolster research into extremely hard materials and efforts to develop ultra-dense computer memories. The researchers are working with an industry partner to apply the technique to development of next-generation LEDs.

Jagdish Narayan and Ashutosh Tiwari used a pulsed excimer laser to create conditions under which nickel self-assembles into 3D, ordered arrays within aluminum oxide and titanium nitride matrices. Applying similar techniques to gallium nitride and zinc oxide, the researchers are hoping to further improve the efficiency of their LED devices.

"Controlled processing and self-assembly in three dimensions are required because you cannot create these structures and then assemble them. They are too small. So, to be able to use this technology, you must have self-assembly and it must be 3D," says Jagdish Narayan.

"In the 6-10nm dots created so far, we have the ability to control the spin patterns - the spin is what stores the bit of information. Assuming a 7nm magnetic nanodot will store one bit of information, we can achieve over 10trillion bits per square inch, which is close to 500 times the existing storage density."

Geared at MEMS

A full, production version of a desktop photolithographic system with a footprint of only 4x4ft is rolling out at a scaled-down price of $100,000-300,000. The Intelligent Micro Patterning LLC system is a micro-mirror-based optical projection scheme that defines patterns directly on photoresist, without requiring a mask. The production version is used for prototyping and lends itself to fabricating MEMS.

"The real savings with our system comes from the drastically reduced turnaround time for defining features," said CEO, Jay Sasserath. A set of masks may run from $5,000 to $10,000, and engineering costs mount during the week or so it takes to get a set of photomasks back from a design service. The desktop exposure system, the SF-100, is able to produce prototypes almost instantly.

It can only produce circuits with feature sizes down to about 5 microns, but for a wide variety of applications such as "microfluidic single-chip labs, RF-MEMS, bioengineered components," it offers fast prototyping and low-cost production.

"An important advantage of our system is the ability to project patterns onto irregular surfaces," Sasserath said. "We are not just limited to Si or GaAs substrates."

Web:www.intelligentmp.com